TOOLKIT

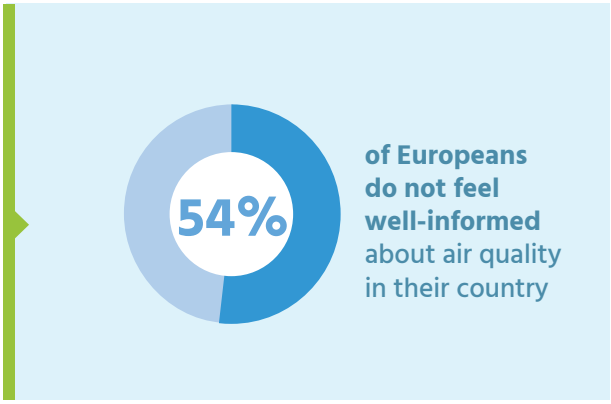
Advocating for clean air: how to communicate the science

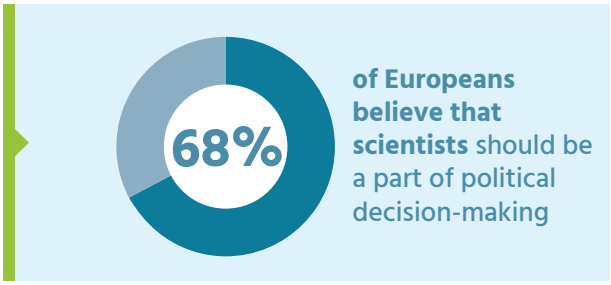
HEAL
HEALTH AND ENVIRONMENT ALLIANCE

A science communications toolkit

A 2019 EU Commission Eurobarometer survey revealed that 54% of Europeans do not feel well-informed about air quality in their country[1]. At the same time, 68% believe that scientists should be a part of political decision-making. However, studies show that they rarely are. Scientists rarely have dedicated capacity to monitor or participate in policy processes or technical forums. This is where civil society organisations working on air quality and health come in to help amplify scientific findings and communicate them to policy makers.

With this toolkit the Health and Environment Alliance (HEAL) aims to provide civil society organisations with the resources to effectively communicate air quality and health science. Based on two decades of HEAL's experience and expertise, it aims to help NGOs across the EU better communicate scientific findings by sharing practical tips and tricks to reach various target audiences.





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Published in July 2022.

Disclaimer:

HEAL gratefully acknowledges the financial support of the European Union (EU) and the ClimateWorks Foundation for the production of this publication.

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HEAL's EU Transparency Register Number: 00723343929-96

Table of contents

1.

Air quality in the EU

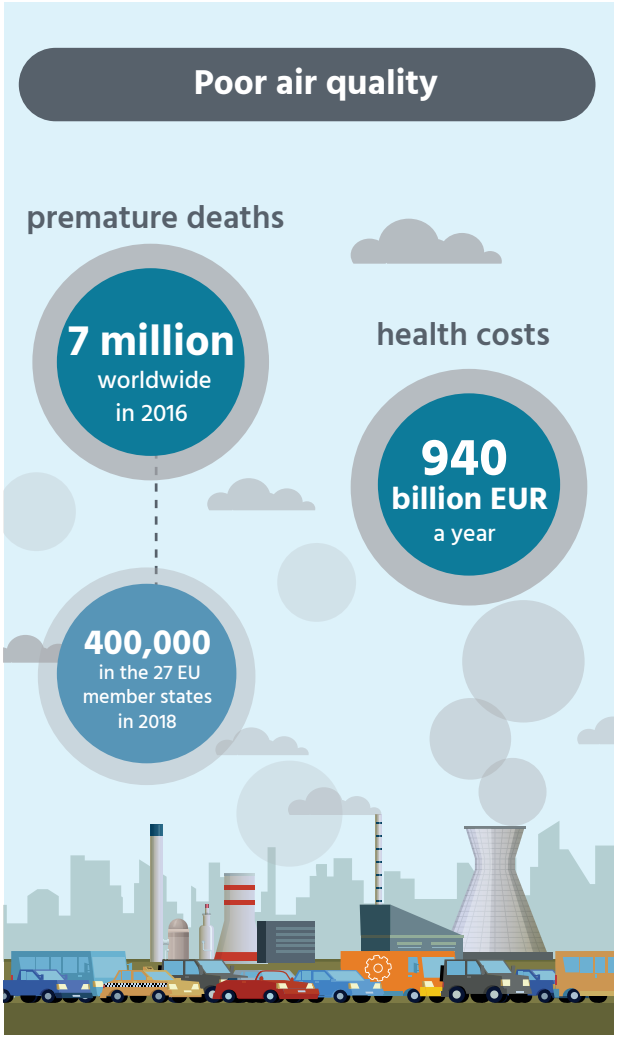
Air pollution is the largest environmental risk to health in Europe and globally. According to the World Health Organization (WHO), poor air quality is the second leading cause of death from noncommunicable diseases (NCDs)[2] after tobacco smoking[3]. It leads to 7 million premature deaths worldwide each year and roughly 400,000 in the 27 EU member states. The health costs from air pollution are estimated at up to 940 billion EUR a year in the EU[4], with the overall health burden higher in Eastern Europe than in Western Europe[5].

The majority of the people in Europe live in cities. On a city level and according to estimates by ISGlobal, a leading research institute, more than 99% of city residents in the EU live in places where Particulate Matter 2.5 levels are harmful to health as they are above the levels recommended by the WHO[6].

A field of rapidly evolving science

Over recent decades, there has been a significant increase in the number of papers investigating the health impact of various air pollutants. New studies link air pollution to a higher risk of diabetes, obesity, dementia and many other health impacts. Air pollution is already an established risk factor for major diseases including heart and lung disease and cancer. These are conditions which greatly harm adult and child health, and cause high costs to health systems all over Europe.

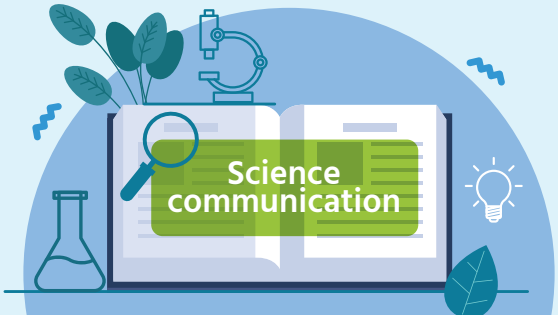
This evolving field of research has been closely monitored by the WHO. Since 1987, the WHO has regularly reviewed all available research on air pollutants' impact on people's health. Based on this extensive, in-depth review of the scientific literature, it compiles guidelines for maximum concentrations for specific air pollutants. These evidence-based recommendations are created to help countries achieve air quality that protects public health.



The recommendations - which were published in 2005 and then updated in 2021 most recently - are of a high methodological quality and are developed through a transparent, evidence-based review process with experts from within and outside the WHO. It is because of this rigorous process based on the latest science that the WHO guidelines can be considered the gold standard for evidence-based decision-making on air quality.

2.

Communicating the science on air quality and health



could be defined as making scientific findings understandable, relatable and useful for a particular audience.

In the case of civil society organisations, this audience is usually policy makers (science-to-policy communication) or the general public.

Communicating the science of air quality and health comes with a goal. When NGOs communicate to policy makers it is often linked to a specific demand such as the importance of new WHO Air Quality Guidelines in protecting the health of Europeans from harmful levels of air pollution. In this case, the aim is to gain EU decision makers' support for air quality standards in the EU that are fully aligned with the WHO's scientific recommendations. Well targeted and timely science-to-policy communication can greatly inform decision making and lead to more evidence-based policies.

Communicating air quality science to the general public helps narrow the gap between scientific research and the public's understanding and awareness. The public can be made aware of the health impacts of air pollution, or of effective solutions to decrease their own health risks. Educating the public can often lead to increased public support for specific policies.

High demand for science communication

In many areas, interest in, expectations of, and engagement with science has grown in recent years. Surveys have shown that respondents most often mention **health** and medical care and tackling **climate change** when asked in which areas research can make a difference.

Globally, the COVID-19 pandemic has enhanced public trust in researchers and science[7]. The number of those who said they trust scientists 'a lot' rose from 34% in 2018 to 43% by the end of 2020. Even before the pandemic, a 2019 Eurobarometer revealed that EU citizens have a positive view of scientists and rate them positively for their: intelligence (89%), reliability (68%) and for being collaborative (66%). More than two-thirds (68%) believe that scientists should intervene in political debates to ensure that decisions take scientific evidence into account.

Similarly, EU policy makers want to draw on a sound evidence base when devising policies. As noted in the 7th EU Environmental Action Programme[8], emphasis should be given to science and new knowledge generation to assure that decisions are informed by the latest data. This also includes integrating citizen science data into EU policies.

Whereas both the public and policy makers appear to value evidence-based information sharing, much valuable research remains unseen and unused, according to a RETHINK science communication research project report[9].

Civil society organiations working on health and air quality play a valuable and needed role in translating the wealth of evidence-based information into policy settings and directly disseminating it to policy makers at relevant moments. The media and wider public are also target audiences for science communiation.

According to various polls, scientists and NGOs seem to be the most trusted stakeholders when it comes to air pollution information[10].

Communicating in an era of science denial

Despite the many studies on air quality and health available from all over the world, polls still show that the average person in Europe feels almost as uninformed about sources of air pollution today (54%) as they did in 2012 (59%). This has been complicated by reports or papers from different sources, often containing different and controversial claims, adding to confusion among the public and policy-makers.[43]

Research shows that people are often unable to distinguish misinformation from fact[11]. This is because citizens need to be able to understand scientific literature, see it in the context of existing research on the same issue, take the source of information into account and judge if the author is an academic or whether vested interests are involved[12].

Most people are unable to do this so they must be able to rely on official, qualified sources. However, we also live in times when anyone can publish "news" and question information coming from officially qualified sources. The overload of contradictory and sometimes false information available online, coupled with the expertise required to understand the issues at stake, has produced the so-called post-truth era[13].

A recent example from Germany exemplifies the problem: In 2019, so-called health experts claimed that there was no proof that air pollution led to people dying, and consequently there was "no scientific justification" for current pollutant limits. Their open letter was widely reported in German media, and it took a couple of days before journalists realised that some of the signatories of the letter had links to the car industry and were not lung experts. Later on, an investigative journalist highlighted that there was a major statistical error in their claims[44]. Major science networks and organisations then published detailed explanations of the science on air pollution to disprove the claims previously made.[14]

Politically, the above led to the German Transport Minister sending an inquiry to the European Commission, asking for a review of current limits.

3.

Message crafting - 6 common frames

To communicate the evidence around air quality and health, it's crucial to think about the impact different messages can have and consciously choose one that fits your overarching goal and that is likely to resonate with the target audience (see more on that in chapter 5).

Many different potential health frames exist to communicate on air quality and our health.

This chapter focuses on six of the most common health frames used.

It provides examples of where the health frame could be used with regard to target audiences to help you decide which frame is the best for your situation.

It's important that no matter what narrative you choose, all claims made have to be evidence-based.

Potential frames

Communication focused on:

Health impacts of air pollution

When it comes to assessing health impacts from air pollution, you will regularly encounter new science covering almost every organ of the human body. The outcome looked at is often premature deaths from various pollutants or increases in risk for certain health conditions such as asthma or other respiratory conditions. Health impact focused studies cover almost all European countries nowadays and are increasingly available even at the city level, representing a great opportunity to communicate science that feels truly relevant to policy makers and the public.

Economic costs of air pollution

Often used in advocacy work towards policy-makers, this angle entails a focus on the economic costs of inaction such as through lost productivity, working hours or GDP costs. On a national level it frequently also includes figures relating to increased health care costs from treating air pollution caused diseases.

Messages focused on the economic cost of air pollution commonly target decision-makers, as they often need to balance budgets and make trade-offs. But such numbers can also be communicated to the public when linked to relatable expenses, such as taxpayer's money. For example, when calling for governments to end fossil fuel subsidies, the public can be made aware of the fact that their tax money is fueling health harming pollution; ultimately resulting in more public support[15].

The co-benefits of action

The cost angle can also be turned into a positive by communicating the economic and health benefits of action, rather than the negatives of inaction. This angle is often referred to as communicating the "co-benefits" of climate action: the multiple benefits of decreasing fossil fuel use for the climate, air pollution, health and the economy. Studies are looking at how decreases in CO_2, for example through less motorised transport in specific cities, also lead to significantly fewer cases of asthma or diabetes through the resulting decreases in air pollution and increases in movement (more walking and cycling). These health co-benefits are often large and many studies try to quantify just how large, offering an additional argument for policy makers working on climate action.

Highlighting inequalities

Air pollution does not impact us all equally; low-income and marginalised people often live in more polluted areas, work in jobs with greater exposure to air pollution, and have more pre-existing health conditions, making them more susceptible to the health impacts of air pollution. A recent citizens science monitoring project confirmed this for Brussels[16]: lower income areas experience higher NO2 levels, while higher income neighborhoods had better air quality at their home location (despite having more cars). Communicating these social vulnerabilities to the public and policy makers openly can lead to tangible actions likely to have a big impact on the ground. Improvements in how our cities are designed need to take these unequal starting points into consideration and studies looking at unequal exposure and unequal impact are crucial in informing policy making especially at the local level.

Vulnerable groups

Having the data to back up arguments for action on air pollution is crucial; however, an impact can also be created by sharing a human story. Highlighting studies that show the harm of air pollution to vulnerable groups such as children or pregnant women offers this human angle. Coupling new figures with this focus on specific groups of people- or even stories of impacted individuals- helps get stories placed in the media and can ultimately have a wide-reaching impact. This is also where the voices of medical professionals come in extra useful, commenting on recent findings and advocating for their patients.

Solutions to air pollution and sharing good practice

Numerous studies look at concrete solutions to air quality issues in cities, including the role of active mobility (walking and cycling) and the corresponding creation of cycling lanes, more green space, car-free zones or low-emission zones. All of these actions come with benefits to health and the climate and are often sought after by local, regional and national level decision makers, who need evidence-backed data for the costly changes they are proposing. Data from Barcelona or Paris for example can help inspire other European cities; local examples are therefore very valuable in any advocacy activities. Modeling studies also have tremendous value in imagining healthier cities: data shows that in Porto, a shift towards more active transportation could lead to up to €6.7 billion in health benefits annually, through reductions in cancer, diabetes, heart and cerebrovascular disease[17]. Another modeling study concluded that if only 25% of the population in EU cities cycled instead of using other modes of transport, over 10,000 premature deaths could be avoided each year[18].

Developing science-based messages

This section and takes each of the six health frames and lists a number of core statements to further illustrate how scientific studies can underpin and help create impactful communication on the importance of acting for better air quality.

It provides a basic statement and examples of scientific findings fro communicate at global, EU, national or city level.

Health impacts

Basic statement
• Air pollution causes premature deaths. • Air pollution impacts the cardiovascular system. • Air pollution impacts the respiratory system.

Example of a scientific finding to communicate	
Global or EU example	**National or city level example**
Particulate matter 10 and 2.5 µm, nitrogen dioxide (NO_2), and ozone (O_3) are all linked to premature death as well as death from cardiovascular, respiratory, and cerebrovascular conditions, according to a set of systematic reviews used to determine the new limit values of the WHO Global Air Quality Guidelines[19].	An analysis of almost 400 cities in 22 countries found that each 10 µg/m3 increase in nitrogen dioxide (NO_2) concentrations was associated with increases in mortality the next day (cardiovascular up 0.37%, respiratory 0.47%)[20]. Researchers from Berlin found that each increase of NO_2 by 10µg/m^3, was associated with a 10% higher risk of hospital admissions for chronic obstructive pulmonary disease (COPD) and asthma on the same day[21]. A Bulgarian study showed that when average daily levels of fine particulate matter exceeded 2005 WHO recommended levels for $PM_{2.5}$ and Pm_{10}, there was an increase of 10% of the use of emergency ambulance services in the city of Sofia[22].

Economic cost of pollution

Basic statement
• Air pollution decreases productivity, increases health system use and health care expenditure.

Example of a scientific finding to communicate	
Global or EU example	National or city level example
The health and economic costs of air pollution due to premature death, lost workdays, healthcare, crop yield loss, and damage to buildings cost up to € 940 billion per year in the EU, equalling up to 9% of EU GDP[23].	French researchers estimate that 1,677 new breast cancer cases each year were attributable to NO_2 pollution in the country. The corresponding total health costs were estimated to be € 825 million per year[24].

Co-benefits of action

Basic statement
• There are many health co-benefits of climate mitigation, such as through reduced air pollution, and they by far exceed mitigation costs.

Example of a scientific finding to communicate	
Global or EU example	National or city level example
Globally, meeting the targets of the Paris climate agreement would be expected to save over one million lives a year from air pollution alone by 2050. The value of the health gains would be approximately twice the cost of the policies[25]. **In the EU**, the annual number of preventable premature deaths could amount to 45 350. In economic terms, reduced emissions could result in US$ 34.3 billion of saved costs of treating illness in the WHO European Region[26].	For each 1 Euro invested in reducing traffic in the city of Grenoble, France, there would be a cost benefit of 68 Euro, mostly through health gains from less air pollution and more active movement[27].

Inequalities

Basic statement
• Socioeconomic status matters when it comes to people's exposure to air pollution and its health impact.

Example of a scientific finding to communicate	
Global or EU example	**National or city level example**
As noted in the 2019 WHO assessment report on environmental health inequalities in Europe, air pollution is a major European environmental challenge that often affects seriously socially disadvantaged areas more than others and can be associated with increased exposure levels among socially disadvantaged populations[28].	In Brussels in 2021, citizen science monitoring data showed that the poorer the neighborhood, the worse the air quality is. Other indicators such as the percentage of unemployed or youth unemployment rates were also linked to higher NO_2 pollution levels[29]. In London, 46% of the geographical areas where the 10% most deprived live had concentrations above the NO_2 EU limit value in 2013. Only 2% of the geographical areas where the 10% most affluent live experienced NO2 concentrations above the EU limit values in 2013[30].

Vulnerable groups

Basic statement

- Air pollution impacts the most vulnerable the most.

Example of a scientific finding to communicate

Global or EU example	National or city level example
According to the WHO, every day around 93% of the world's children under the age of 15 breathe air that is so polluted it puts their health and development at serious risk. WHO estimates that in 2016, 600,000 children died from acute lower respiratory infections caused by polluted air[31].	Children exposed to higher levels of PM and NO_2 pollution developed smaller lungs than those exposed to lower levels, a birth cohort study with 900 children from Germany showed. This was even the case when NO_2 levels were lower than the World Health Organization recommended limits[32]. Using high-resolution neuroimaging data from 800 school-age children and 3,100 pre-adolescents from Rotterdam, the Netherlands, researchers found that early life exposure to air pollution was associated with a thinner cortex in various regions of the brain[33].

Solutions

Basic statement

- Sticking to stricter limit values can greatly prevent much of the health harm from air pollution.
- We have the technical and other solutions to prevent harmful air pollution.

Example of a scientific finding to communicate

Global or EU example	National or city level example
According to ISGlobal, compliance with WHO air pollution guidelines could prevent 51,213 deaths a year across 1,000 cities caused by exposure to particulate matter ($PM_{2.5}$) and 900 deaths caused by nitrogen dioxide (NO_2) exposure.	A modeling study from Grenoble, France, found that in order to get a 67% decrease in premature deaths caused by $PM_{2.5}$, changes in two sectors had to be made simultaneously: replacing wood heating by pellet stoves & reducing traffic; this would yield a cost benefit of €30 and €68 respectively for each €1 invested.

4.

Step by step: successful communication

SETTING YOUR GOAL

What you decide to share, who you share it with and what messages you choose, will greatly depend on your motivation for engaging with the topic in the first place. This is why any science communication activity must start with defining your goal, before you start thinking about your audience, timing, messages and channels. Here are some concrete but in no way exhaustive questions to help you identify your communication goal. Setting a goal often goes hand-in-hand with thinking about your target audience, which the below questions illustrate well:

Do you aim to highlight the health argument for fully WHO aligned air quality standards in the EU to a particular group of policy makers?

Do you aim to educate the public on the urgency of acting on air pollution so that they sign your petition?

Do you aim to approach local policy makers with a concrete example of a city-level clean air intervention you want implemented?

Do you aim to get an article published in a EU media outlet commenting on a particular new study of relevance to an ongoing policy file, hoping to raise awareness among the general public?

WHO CAN MAKE IT HAPPEN?

Once you know what you want to achieve, you need to better define your target audience and think about how to reach them. This includes a thorough analysis of the decision-making process that you are aiming to inform. Who are the people who make the decisions you wish to influence? Who has to be addressed first and who might be of relevance only at a later point in the timeline? Trying to "reach all" rarely works and is neither time nor cost effective.

In the case of civil society organisations working on air and health, the target audience is usually policy makers on local, regional, national or EU level (depending on what level you are working on); but also the general public, defined as citizens of a particular city, region, country or EU overall.

There is also another potential target audience: the media. Reaching the media with our frame of choice, or even being quoted, is generally good news. Whereas it does not always trigger immediate action, having the media communicate regularly on the negative health impacts of air pollution or the potential benefits of action increases public awareness over time and ultimately, political pressure on a policy maker or institution.

Accessing the media is hard work and differs in each country and context. Bear in mind that journalists everywhere need well-sourced material, accomplished experts and a good, ideally human story.

Each audience - policy makers, the public, the media - requires a slightly different approach in terms of language used and detail of evidence presented.

Policy makers: evidence is best cited clearly and with rigorous references linked to concrete issues and recommendations of relevance to that person's field of work and/or policy file. It should be short and concise to appeal to busy policy maker schedules and the high influx of emails and materials they receive daily. You need to know when to highlight which evidence to which policy-maker.

Decision-makers are not necessarily better informed than the ordinary citizen and they work under significant time pressure - so any information that is presented in a comprehensive and scientifically sound way will make their lives easier, build trust with us and make them come back for more information. Equally, behind each policy maker there is a citizen with a family, possibly children, and their own concerns. This is the reason why communicating science specifically on health impacts can work so well: it impacts all of us; albeit unequally.

The general public: evidence must be translated into widely understandable language. Avoid jargon, extensive references and multiple numbers. Focus on one or two core findings, use visual support and repeat core messages often.

The media: tailor your approach to the outlet and your goal. Facts need to be clearly presented, avoiding too much policy or advocacy speak, and, ideally paired with a story with a human angle. This could be a patient, a doctor, a parent advocating for clean air or suffering from bad air quality, a success story from a city where air pollution has been reduced, an expert from the World Health Organization or another scientist explaining the latest research in non-nerdy language.

CRAFTING RECOMMENDATIONS FOR POLICY MAKERS

Air quality can be approached from various health frames - such as health impacts, economics, co-benefits, inequalities and potential solutions. Each frame has a substantial evidence base to support it (see chapter 4 for details).

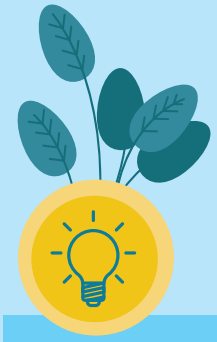
Developing recommendations for policy makers:

Recommendations for policy makers must be linked to relevant scientific evidence. While scientists present findings in an academic way, civil society organisations can and should couple this evidence with clear and actionable recommendations which support the case for clean air.

For example, if one of your recommendations concerns the implementation of additional safe cycling lanes in your city, support it by referring to the concrete health and climate benefits of creating additional cycling lanes in another city, according to a recent study. It is even better if you can link the recommendation to a particular policy currently under revision and assign it a date.

Recommendations need to be clear and concise, presented either as a one-pager or as the main point in a letter, that can be distributed easily in person or online. Policy workers' lives are fast-paced and they do not have time to sift through long texts.

Finally, to ensure a key point is not only understood but remembered, use repetition: state it at the beginning of your communication and repeat it at least once.



KEY TIPS

1. **Embed science in recommendations**: Summarise what you want to say in a few bullet points.

2. **Assure relevant timing:** Share the science early enough for it to be considered in policy discussions.

3. **Provide sources and contact information** so that policy makers may easily ask for more details or your assistance.

IDENTIFYING THE BEST CHANNELS TO REACH YOUR AUDIENCE

Once you have numbers and findings to share, know who you want to share them with and you have defined your goal, it's time to decide which online and offline channels to use.

Whether you choose to communicate evidence-based information offline or online, or both, will largely depend on your pre-defined goals and target audiences.

For example, if you target national level decision makers to gain their support for air quality standards that are fully aligned with WHO recommendations, you might:

Write a letter filled with evidence-based air quality facts and science-backed recommendations or demands

Aim for a personal meeting with a member of the policy maker's team and bring a one-pager containing evidence-based air quality facts

Include three key figures in an online presentation with policy makers present

Target the decision maker in question via Twitter by sending a series of tweets directed to them, including evidence-based numbers, supported by attractive visuals

Share an infographic containing your core facts and figures on Facebook to raise awareness among the public and possibly ask them to sign a petition, which you then deliver to the targeted decision maker.

Spotlight on social media

Social media is a great tool for communicating about air pollution and health, thanks to its accessibility and wide use among the general public as well as government bodies and policy makers. Social media is free to use for everyone and can be a fantastic way to reach not only like-minded people to exchange knowledge, but also to make your voice(s) heard among policy makers.

When communicating online there is often a two-way exchange: readers are able to like, share and, most importantly, comment on what you put out with greater ease compared to traditional formats such as newspapers. You can easily start a conversation with your audience and learn about their preferences, helping to improve your messaging over time.

The main social media platforms used for air quality and health communication are Twitter, Facebook, Instagram, LinkedIn and YouTube.

Which one you choose will greatly depend on your country's and target group's preference.

For example, Twitter is commonly used to influence policy makers and other stakeholders on EU level, but in 2022, it is not considered very useful in countries like Bulgaria, as very few national decision makers have Twitter accounts. Instead they are better targeted on Facebook in the country. Finally, Facebook and Instagram content tends to be lighter, more personal and emotional, whereas Twitter and LinkedIn can be relatively dry, factual and use more jargon.

Preparing messaging and material for social media is a great exercise to really get to the core of your messaging. Space and attention is limited, making it similar to the so-called elevator pitch - a very limited opportunity to get your message across.

Twitter: key messages in 280 characters - dos and don'ts

This section provides examples of how to create high quality science messages to both decision makers and the public, using Twitter as example channel

Low quality message	Reason	High quality message
Dutch researchers found that early life exposure to air pollution was associated with adverse **brain outcomes in various measures of brain structural morphology, structural connectivity, and functional connectivity** in childhood and adolescence.	Too much detail/ too much jargon	Dutch researchers found that early life exposure to air pollution was associated **with adverse brain outcomes in various regions** of the brain in childhood and adolescence[36].
An analysis of almost 400 cities in 22 countries found that as NO_2 concentrations rose by 10 µg/m^3, this **caused more** cardiovascular and respiratory deaths the next day.	Scientifically inaccurate; assumes that correlation equals causation[37].	An analysis of almost 400 cities across 22 countries found that each 10 µg/m^3 increase in nitrogen dioxide (NO_2) concentrations **was linked to** increases in cardiovascular and respiratory mortality the next day.
Reducing $PM_{2.5}$ air pollution to @ WHO recommended levels could prevent up to 125,000 premature deaths across Europe's cities.	Not wrong but not optimal: not targeted at anyone; no clear demand/request	Reducing $PM_{2.5}$ pollution to @ WHO recommended levels could prevent up to 125k premature deaths across Europe's cities. **EU Commissioners must act: we need stricter EU air quality standards by 2030!**

VISUALS, TAGS AND HASHTAGS

Visuals: Once you have the messages you want to use, your target audience is defined and you've picked a tone and channel, it's time to think about making your message visually appealing.

Whether you like to use photos, infographics, or rather stick to text alone is ultimately up to you.

Quantitative information presented visually, through the use of graphics, tends to be better understood and retained than comparable information presented in tables. Visuals also score higher and generate more engagement and response on all social media platforms.

This means that if your social media post is accompanied by a visual it will appear more widely. For example, the Facebook algorithm prioritises visuals over text alone, and a visual allows you to tag up to 10 people on Twitter.

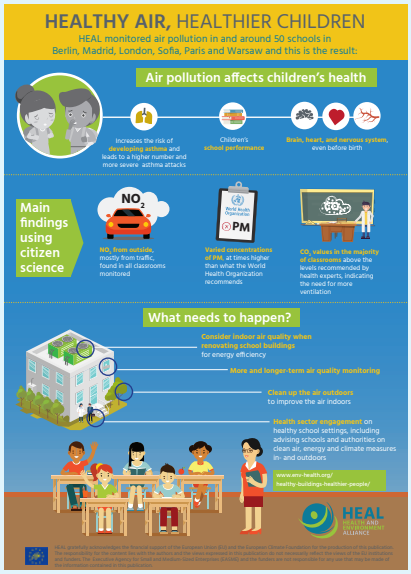
Infographics are a great way to visualise complex information. They are usable on web and social media platforms, in flyers and small brochures, and in reports. They tend to be a one pager, a mix of graphics or other visuals and short text. A good infographic can relay messages in a much more direct way than forcing a report or briefing on someone who doesn't have the time to dive into the details.

Tags: On Twitter, image files will allow you to tag the specific people you want to reach. At the EU level, all major institutions and many individual decision makers have Twitter accounts, allowing you to direct messages to them.

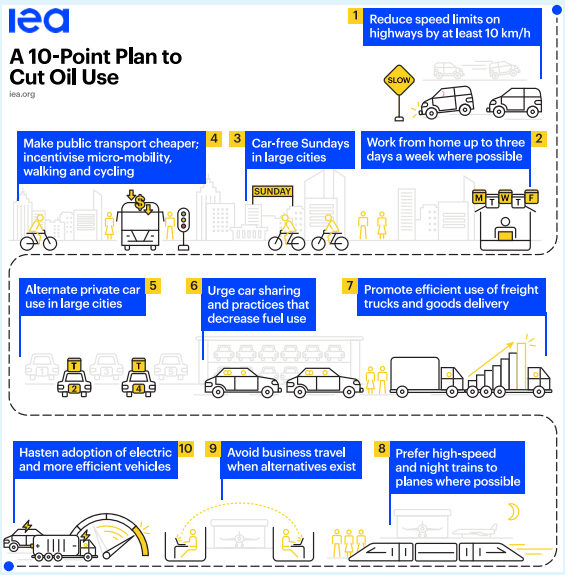
Hashtags: If you want your message to reach a wider audience on Twitter, working with hashtags is a must. Essentially, a hashtag is a label that makes it easier to find information with a theme or specific content. Relevant hashtags in the air quality field are the ones others and your potential target audience are also looking at. Do not just invent a hashtag because your post will be the only one linked to it. Instead, use common EU air quality ones. For example if your work is focused on the EU, **#AirPollution** and **#AirQuality** are ok, but for the EU context **#CleanAirEU** (what the Commission uses) or **#CleanAir4Health** (what we use) are best.

Hashtags in your country might of course be different, and not in English, so it is worth looking those up.

Some examples of science focused visuals and evidence-based infographics:

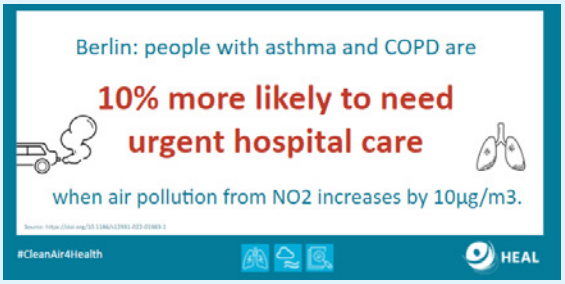


Healthy Air - Healthier Children, HEAL, 2019

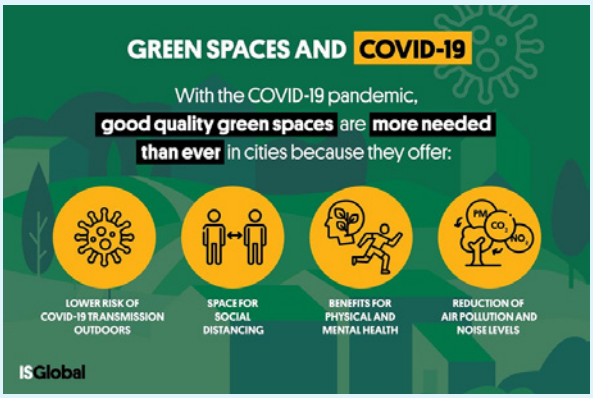


10 Step plan to cut oil use, International Energy Agency, 2021

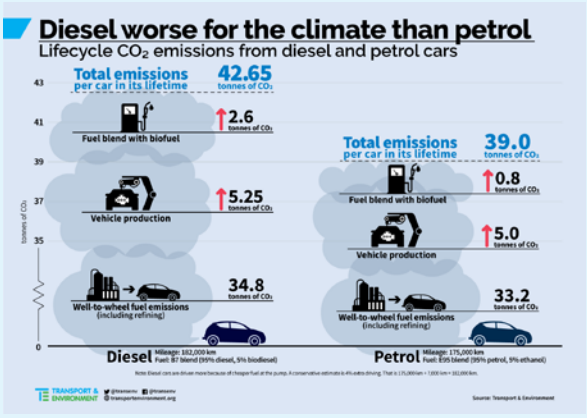
Healthy Buildings, Healthier People, HEAL, 2020



Fact card sharing latest science, HEAL, 2022



Green Spaces and COVID-19, ISGlobal, 2022

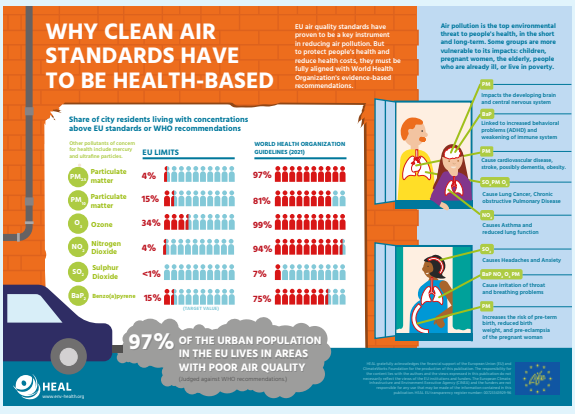


Car emissions by fuel type, Transport& Environment, 2017

Preventable premature deaths per selected city for $PM_{2.5}$ upon meeting new WHO guidelines, HEAL, 2022

COVID-19 Protect Yourself, WHO, 2020

Avoidable deaths upon meeting new WHO guidelines, ISGlobal, 2021



Why clean air standards have to be health-based, HEAL, 2021

CREDIBLE SOURCES

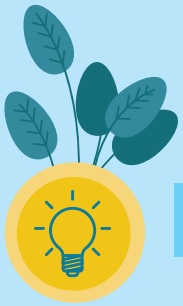
HEAL's communication efforts are often motivated by a recent paper whose findings deserve to be communicated to the public or particular policy makers. For example, in 2021 research was published by ISGlobal estimating how many premature deaths could be prevented in 1,000 European cities if cities were to adhere to WHO suggested air quality guidelines. Amplifying such findings is a fantastic opportunity for civil society organisations.

However, such studies are not always readily available for communication on our desks. Often it is down to us to find communication-worthy pieces of research and elevate the work of researchers whose studies would have otherwise not made it to policy makers' inboxes. In the field of air quality and health, finding newsworthy research papers is not a problem. In the last 10 years, more than 40,000 studies have been added to the PubMed search engine alone.

Scientific literature on air quality and health can easily be found via search websites such as PubMed -https://pubmed.ncbi.nlm.nih.gov - under keywords such as "air quality" and "air pollution and health". Specific studies can also be found using search terms like "infant health air pollution" and "respiratory health particulate matter". This will yield hundreds of articles which you can then filter based on year and other criteria. Other popular search websites for air quality and health papers are Science Direct, Cochrane Library or Google Scholar.

Some articles are free to access, such as the systematic reviews underlying the new WHO Air Quality Guidelines, which cover more than 500 papers. You can find all of the considered systematic reviews as open access files in a special issue of Environment International[38]. Some articles are free to access however, many are not. Huge portions of scientific research are still behind paywalls, inaccessible to most citizens. Often, reading the freely available abstract of the paper is sufficient to see whether the paper is of interest to you and your organisation´s work. Abstracts can already include detailed key findings and messages you can work with. If you require access to the full paper you have a number of options:

When sharing new science on a less known air pollution impact, make sure you highlight uncertainties and the need for further research. For example, for new findings not yet supported by repeated and multiple studies, you could refer to the findings as "emerging evidence" or highlight that more research is needed.



KEY TIPS

When scientific papers are hidden behind paywalls

Get the paper directly from the author: researchers do not benefit financially from the paywalls in place for their paper; they are usually happy to share the paper with you free of charge. You can contact many researchers via Researchgate.net. Alternatively, their email addresses are easily found via Google or their university/research institute.

Try websites such as Unpaywall https://unpaywall.org/ listing millions of free papers.

CITIZEN SCIENCE

In recent years, many people across Europe have started to monitor air quality where they live. They have been concerned about air pollution in their immediate surroundings and, in many cases, the lack of official monitoring.

Citizen science can be defined as 'science which assists the needs and concerns of citizens' and as 'a form of science developed and enacted by the citizens themselves'[39]. Citizen science initiatives with a focus on air quality commonly use low-cost measuring devices to learn more about local or regional air pollution and its sources.

According to a 2020 report by the EEA[40], citizen science initiatives can produce useful information about local air quality. Such information can be used to improve official air quality models and to ultimately identify suitable actions to improve air quality.

In cities or countries where official monitoring stations are scarce, citizen science can offer the data needed to communicate and ultimately, bring about change.

Citizen science also contributes to public education and awareness and when communicated well to the people affected, it can help people make individual changes to, for example, their way to work. When it comes to communicating the results of citizen science projects to policy makers, the results must be of high quality and, usually, complementary to official data.

A 2021 example of a large scale citizen science project comes from Brussels where 3,000 citizens participated in CurieuzenAir, run by the urban movement BRAL and supported by many others[41]. It resulted in a unique dataset showing the impact of road traffic on air quality in Brussels in great detail[42]. The project revealed that 98.6% of the population in Brussels lives or works at a location that exceeds the WHO recommended levels for NO_2 pollution (set at 10 µg/m^3) and that there is a clear link between the socio-economic status of inhabitants and the air quality at their home location. This kind of extensive and detailed data holds value beyond Brussels. According to its organisers, if the methods of data collection would be applied in other EU cities, they would likely show similar patterns and trends, representing a case study for the impact of air quality policies across all European cities.

MISINFORMATION AND TROLLS

As touched upon in section 3.3 (Communicating science in an era of science denial), this can be due to a lack of information on the side of the commentator, or delibarately shared false information by for example industry groups.

How you deal with such people, often also refered to as "internet trolls"*, is entirely up to you and your organisation's internal strategy regarding the matter.

From HEALs point of view, given limited resources and capacity, responding to individual people`s misinformed comments is unlikely to be a good use of an NGO´s time. Considering research on how people change their opinions[43], engaging in that kind of online communication is highly unlikely to swing that person in the other direction.

* An internet troll deliberately tries to offend, cause trouble or directly attack people by posting derogatory comments on social media platforms and forums.

5.

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